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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/680,356	10/06/2003	Chiaki Ishii	58600-8229.US00	5651
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EXAMINER				
POPA, ILEANA				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/680,356

**Applicant(s)**

ISHII ET AL.

**Examiner**

ILEANA POPA

**Art Unit**

1633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 October 2007.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 and 21 is/are pending in the application.  
4a) Of the above claim(s) 13-18 and 21 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-12 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/5508)  
Paper No(s)/Mail Date 10/09/2007  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in the prior Office action.

2. Claims 19 and 20 have been cancelled. Claims 13-18 and 21 have been withdrawn.

Claims 1-12 are under examination.

***Response to Arguments***

***Claim Rejections - 35 USC § 102***

3. Claims 1, 2, 9, 11, and 12 remain rejected under 35 U.S.C. 102(b) as being anticipated by Boxer et al. (WO98/23948) for the reasons of record set forth in the non-final Office action. Applicant's arguments filed 10/09/2007 have been fully considered but they are not persuasive.

Applicant traversed the instant invention on the grounds that Boxer et al. only teach that a biomolecule, which can be a polynucleotide, is covalently or non-covalently attached to a lipid of the bilayer expanse, and therefore, they do not teach using complementary oligonucleotides to attach biomolecules to the bilayer expanse. Applicant submits that, since Boxer et al. do not teach each and every element of the instant claims, the rejection should be withdrawn.

Applicant's arguments are acknowledged, however, the rejection is maintained for the following reasons:

Boxer et al. teach covalently attaching biomolecules to lipids in the bilayer expanse to create a surface having the desired properties, wherein the biomolecules are used to non-covalently attach other molecules of interest to the bilayer via specific high affinity molecular interactions, wherein the biomolecules can be polynucleotides, and wherein the biomolecules can serve as "a receptors for nucleic acids" (p. 4 bridging p. 5, p. 18, lines 7 and 8, p. 11 bridging p. 12, p. 16, lines 3-5), i.e., Boxer et al. teach that interaction between complementary nucleic acids (i.e., oligonucleotides) can be used to attach molecules of interest to the bilayer expanse. Therefore, Boxer et al. anticipate the claimed invention and the rejection is maintained.

***Claim Rejections - 35 USC § 103***

4. Claims 1, 2, and 9-12 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Boxer et al., in view of Cornell et al. (U.S. Patent No. 5, 874,316), Arnold et al. (U.S. Patent 5, 310, 648), or Bayerl et al. (U.S. Patent No. 6,051,372) for the reasons of record set forth in the non-final Office action. Applicant's arguments filed 10/09/2007 have been fully considered but they are not persuasive.

Applicant traversed the instant rejection on the grounds that Boxer et al. not teach using complementary oligonucleotides to attach biomolecules to the bilayer expanse and that one of skill in the art would not modify their teachings by replacing the polynucleotide bound to a lipid molecule with a biomolecule anchored to a lipid bilayer

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via complementary oligonucleotides. Applicant argues that Cornell et al., Arnold et al., or Bayerl et al. do not cure the deficiencies of Boxer et al. Applicant argues that although Cornell et al., Arnold et al., or Bayerl et al. are used for teaching self-limiting lateral diffusion (claim 10), their teachings are different from the instant invention because they teach methods of restricting lateral diffusion that affect the entire membrane by reducing the fluidity and functionality of the whole lipid bilayer expanse, making it unsuitable as a lipid bilayer array. Applicant argues that in the instant invention self-limiting lateral diffusion results from the fact that a planar lipid bilayer deposited on a substrate will diffuse to make its dimensions about 106% of the original dimension, after which there is no further expansion or diffusion of the lipids at the borders; however, there is still diffusion and fluidity of the bilayer away from the edges of the membrane. Therefore, Applicant requests the withdrawal of the rejection.

Applicant's arguments are acknowledged, however, the rejection is maintained for the following reasons:

Regarding Boxer et al. see above. Because Boxer et al. teach using complementary nucleic acids (i.e., oligonucleotide) to attach molecules of interest to the lipid bilayer, one of skill in the art would not need to modify their method, as Applicant argues. Cornell et al., Arnold et al., or Bayerl et al. were cited for teaching claim limitations other than tethering via complementary oligonucleotides. In response to Applicant's argument that the Cornell et al., Arnold et al., or Bayerl et al. fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., diffusing of the lipid bilayer to make its dimension about 106% as

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compared to the original dimension) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). For the reasons above and for the reasons stated in the non-final Office action, the claimed invention was *prima facie* obvious over the combined teachings of the cited prior art and the rejection is maintained.

5. Claims 1-7 and 9-12 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Boxer et al., as applied to claims 1, 2, 9, 11, and 12 above, in view of both Boukobza et al. (J Phys Chem, 2001, 105: 12165-12170) and Niemeyer (DE 19902391, Abstract) for the reasons of record set forth in the non-final Office action. Applicant's arguments filed 10/09/2007 have been fully considered but they are not persuasive.

Applicant traversed the instant rejection on the grounds that Boxer et al. do not teach using complementary oligonucleotides to attach biomolecules to the bilayer expanse, that Boukobza et al. teach using biotin-avidin and thus the entire bilayer is affected, which is in contrast with the instant invention wherein the array can have selective binding based on different oligonucleotide sequences, and that Niemeyer does not mention anchoring molecules via oligonucleotides. Therefore, Applicant argues that, based on the teachings of Boukobza et al. and Niemeyer, one of skill in the art would not modify the teachings of Boxer et al. by replacing the polynucleotide bound to

a lipid molecule with a biomolecule anchored to a lipid bilayer via complementary oligonucleotides and requests the withdrawal of the rejection.

Applicant's arguments are acknowledged, however, the rejection is maintained for the following reasons:

Regarding Boxer et al. see above. Because Boxer et al. teach using complementary nucleic acids (i.e., oligonucleotide) to attach molecules of interest to the plasma membrane, one of skill in the art would not need to modify their method, as Applicant argues. Boukobza et al. and Niemeyer were cited for teaching claim limitations other than tethering via complementary oligonucleotides. For these reasons and for the reasons stated in the non-final Office action, the claimed invention was *prima facie* obvious over the combined teachings of Boxer et al., Boukobza et al. and Niemeyer, and the rejection is maintained.

6. Claims 1, 2, 8, 9, 11, and 12 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Boxer et al., in view of Shen et al. (PGPUB 2003/0148335) for the reasons of record set forth in the non-final Office action. Applicant's arguments filed 10/09/2007 have been fully considered but they are not persuasive.

Applicant traversed the instant rejection on the grounds that Boxer et al. do not teach using complementary oligonucleotides to attach biomolecules to the bilayer expanse and that one of skill in the art would not modify their teachings by replacing the polynucleotide bound to a lipid molecule with a biomolecule anchored to a lipid bilayer via complementary oligonucleotides based on the teachings of Shen et al. because

Shen et al. do not mention using complementary oligonucleotides to tether molecules to the lipid bilayer.

Regarding Boxer et al. see above. Because Boxer et al. teach using complementary nucleic acids (i.e., oligonucleotide) to attach molecules of interest to the plasma membrane, one of skill in the art would not need to modify their method, as Applicant argues. For these reasons and for the reasons stated in the non-final Office action, the claimed invention was *prima facie* obvious over the combined teachings of Boxer et al. and Shen et al. The rejection is maintained.

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ileana Popa whose telephone number is 571-272-5546. The examiner can normally be reached on 9:00 am-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Woitach can be reached on 571-272-0739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ileana Popa, PhD

/Joseph T. Woitach/

Supervisory Patent Examiner, Art Unit 1633